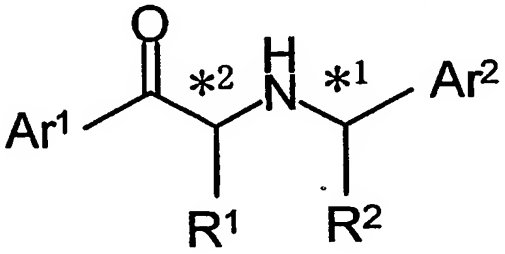
AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

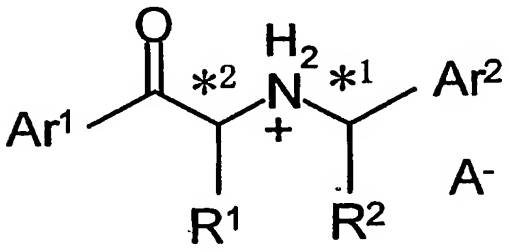
LISTING OF CLAIMS:

1. (original): A process for producing an optically active α-substituted aminoketone represented by formula (4):



(4)

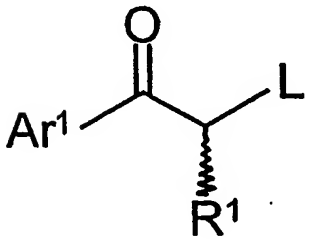
(wherein Ar^1 and Ar^2 each independently represent a substituted or unsubstituted C_6-C_{15} aryl group, R^1 represents a C_1-C_{12} alkyl or C_7-C_{12} aralkyl group, R^2 represents a C_1-C_{12} alkyl group, *1 and *2 each represent an asymmetric carbon atom) or an optically active α-substituted aminoketone salt represented by formula (5):



(5)

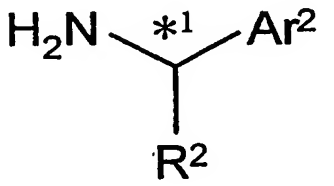
(wherein Ar^1, Ar^2, R^1, R^2, *1, and *2 are the same as above, and A^- represents a counter anion), the process comprising the steps of:

reacting an α-substituted ketone represented by formula (1):



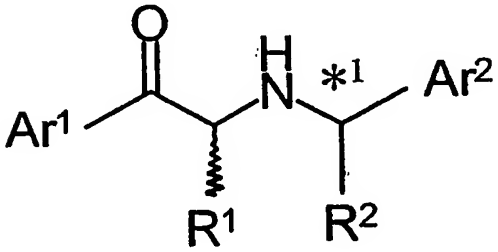
(1)

(wherein Ar^1 and R^1 are the same as above, and L represents a leaving group) with an optically active amine represented by formula (2):



(2)

(wherein Ar^2, R^2, and *1 are the same as above) to yield a mixture of diastereomers of an optically active α-substituted aminoketone represented by formula (3):



(3)

(wherein Ar^1, Ar^2, R^1, R^2, and *1 are the same as above); and

isolating one diastereomer from the mixture after optionally yielding salts of the diastereomers with an acid.

2. (original): The process according to claim 1, wherein L is a halogen atom.

3. (original): The process according to claim 2, wherein the halogen atom is a chlorine atom or bromine atom.

4. (currently amended): The process according to ~~any one of claims 1 to 3~~ claim 1 wherein Ar^2 is a phenyl group or a p-methoxyphenyl group; and R^2 is a methyl group.

5. (currently amended): The process according to ~~any one of claims 1 to 4~~ claim 1, wherein R^1 is a methyl group or an ethyl group.

6. (currently amended): The process according to ~~any one of claims 1 to 5~~ claim 1, wherein, in the step of isolating the diastereomer from the mixture of the diastereomers of the optically active α-substituted aminoketone represented by formula (3), a crystallization method, a chromatographic method, or a distillation method is employed.

7. (currently amended): The process according to ~~any one of claims 1 to 5~~ claim 1, wherein, in the step of isolating the diastereomer from the mixture of the diastereomers of the optically active α-substituted aminoketone represented by formula (3), the salts of the

diastereomers with the acid are yielded, and the salt of one diastereomer is preferentially crystallized from a solvent.

8. (original): The process according to claim 7, wherein the acid is sulfonic acid.

9. (original): The process according to claim 8, wherein the sulfonic acid is methanesulfonic acid.

10. (currently amended): The process according to ~~any one of claims 7 to 9~~ claim 7, wherein the solvent is at least one selected from the group consisting of ester solvents, ether solvents, ketone solvents, halogenated solvents, alcohol solvents, hydrocarbon solvents, nitrile solvents, and water.

11. (currently amended): The process according to ~~any one of claims 7 to 9~~ claim 7, wherein the solvent is ethyl acetate, acetone, or dimethoxyethane.

12. (currently amended): The process according to ~~any one of claims 1 to 11~~ claim 1, wherein, in formula (4) or (5), the absolute configuration at *2 is S and the absolute configuration at *1 is R; or the absolute configuration at *2 is R and the absolute configuration at *1 is S.

13. (original): The process according to claim 7, wherein the acid is hydrogen halide.

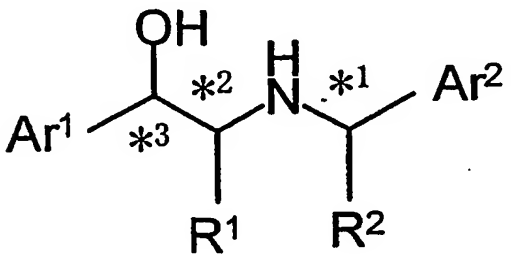
14. (original): The process according to claim 13, wherein the hydrogen halide is hydrogen chloride or hydrogen bromide.

15. (currently amended): The process according to claim 7~~, 13, or 14~~, wherein the solvent is an alcohol solvent or water.

16. (currently amended): The process according to claim 7~~, 13, or 14~~, wherein the solvent is ethanol or a mixture of ethanol and water.

17. (currently amended): The process according to ~~any one of claims 13 to 16~~ claim 13, wherein, in formula (4) or (5), the absolute configuration at *2 is R and the absolute configuration at *1 is R; or the absolute configuration at *2 is S and the absolute configuration at *1 is S.

18. (currently amended): A process for producing an optically active β-substituted amino alcohol represented by formula (6) or a salt thereof:



(6)

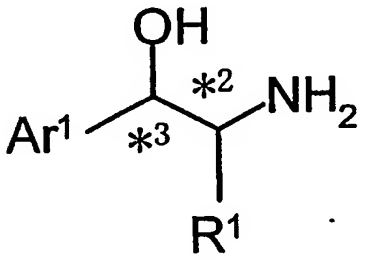
(wherein Ar^1, Ar^2, R^1, R^2, *1, and *2 are the same as in formula (4) of claim 1~~above~~, and *3 represents an asymmetric carbon atom), comprising a step of stereoselectively reducing an optically active α-substituted aminoketone represented by formula (4) ~~above~~ of claim 1 produced by the process of claim 1 or an optically active α-substituted aminoketone salt represented by formula (5) ~~above~~ of claim 1 produced by the process of claim 1.

19. (currently amended): The process according to claim 18, wherein the step of stereoselectively reducing comprises selectively reducing an anti-isomer ~~is selectively reduced~~ using a boron compound in methanol, ethanol, or a mixture of ethanol and water.

20. (original): The process according to claim 19, wherein the boron compound is sodium borohydride.

21. (currently amended): The process according to ~~any one of claims 18 to 20~~ claim 18, wherein, in formula (6), the absolute configuration at *2 is S, the absolute configuration at *1 is R, and the absolute configuration at *3 is R; or the absolute configuration at *2 is R, the absolute configuration at *1 is R, and the absolute configuration at *3 is S; or the absolute configuration at *2 is R, the absolute configuration at *1 is S, and the absolute configuration at *3 is S; or the absolute configuration at *2 is S, the absolute configuration at *1 is S, and the absolute configuration at *3 is R.

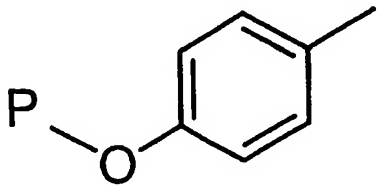
22. (currently amended): A process for producing an optically active β-amino alcohol represented by formula (7) or a salt thereof:



(7)

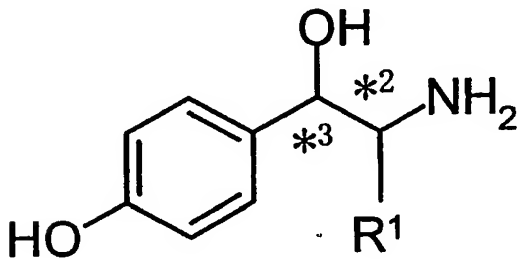
(wherein Ar^1, R^1, *2, and *3 are the same as in formula (6) of claim 18~~above~~), comprising the step of hydrogenolyzing an optically active β-substituted amino alcohol represented by formula (6) or a salt thereof produced by the process of claim 18.

23. (currently amended): The process according to claim 22, wherein, in formula (6), Ar^1 is a p-hydroxyphenyl group or a hydroxyl-protected p-hydroxyphenyl group represented by formula (10):



(10)

(wherein P represents a hydrogen atom or a protecting group protecting the hydroxyl group), and an optically active β-amino alcohol represented by formula (9) or a salt thereof:



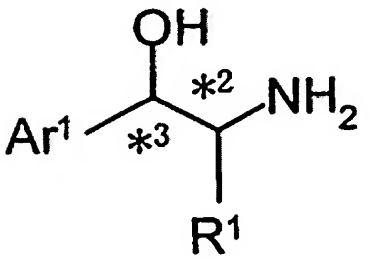
(9)

(wherein R^1, *2, and *3 are the same as in formula (6)~~above~~) is produced by the hydrogenolysis after optionally removing the protecting group protecting the hydroxyl group.

24. (currently amended): The process according to claim 23, wherein P represents a benzyl-containing~~type~~ protecting group, an aroyl-containing~~type~~ protecting group, or a sulfonyl-containing~~type~~ protecting group.

25. (currently amended): The process according to ~~any one of claims 22 to 24~~ claim 23, wherein, in formula (9), the absolute configuration at *2 is S and the absolute configuration at *3 is R; or the absolute configuration at *2 is R and the absolute configuration at *3 is S.

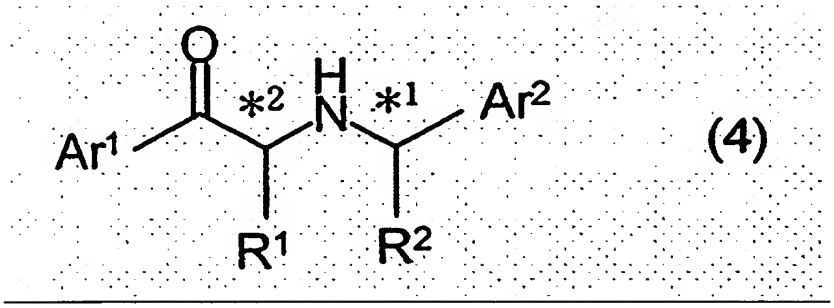
26. (currently amended): A process of producing an optically active β-amino alcohol represented by formula (7) ~~above~~ or a salt thereof:



(7)

(wherein Ar^1 represents a substituted or unsubstituted C_6-C_{15} aryl group, R^1 represents a C_1-C_{12} alkyl or C_7-C_{12} aralkyl group, and *2 and *3 each represents an asymmetric carbon atom, comprising:

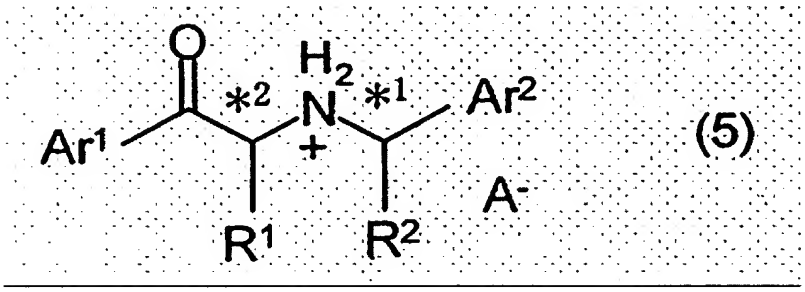
stereoselectively reducing while simultaneously performing a hydrogenolysis of ~~, wherein~~ an optically active α-substituted aminoketone represented by formula (4) ~~above~~:



(4)

(wherein Ar^1, R^1 and *2 are the same as in formula (7), Ar^2 represents a substituted or unsubstituted C_6-C_{15} aryl group, R^2 represents a C_1-C_{12} alkyl group and*1 represents an asymmetric carbon atom)

or of an optically active α-substituted aminoketone salt represented by formula (5) ~~above~~:



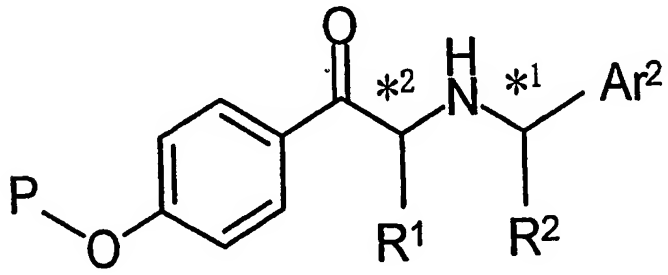
(5)

(wherein Ar^1, Ar^2, R^1, R^2, *1, and *2 are the same as in formula (4), and A^- represents a counter anion)~~is stereoselectively reduced while simultaneously performing the hydrogenolysis~~.

27. (currently amended): The process according to claim 26, wherein the anti-isomer is selectively reduced by hydrogenation in the presence of a transition metal catalyst while simultaneously performing the hydrogenolysis.

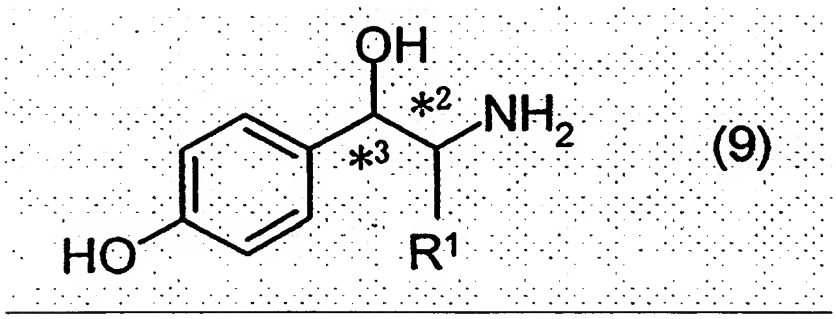
28. (original): The process according to claim 27, wherein the transition metal catalyst comprises palladium-carbon or palladium(II) hydroxide-carbon.

29. (currently amended): The process according to ~~any one of claims 26 to 28~~ claim 26, wherein an optically active α-substituted aminoketone represented by formula (11) or a salt thereof:



(11)

(wherein R^1, R^2, Ar^2, *1, and *2 are the same as in formula (4), and P represents a protecting group protecting the hydroxyl group~~are the same as above~~) is stereoselectively reduced while simultaneously performing the hydrogenolysis after removing the protecting group protecting the hydroxyl group to yield an optically active β-amino alcohol represented by formula (9) ~~above~~ or a salt thereof



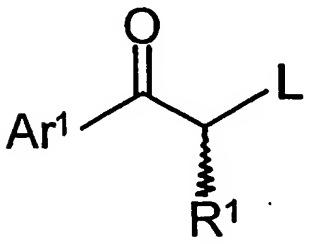
(wherein R^1 and *2 are the same as in formula (11), and *3 represents an asymmetric carbon atom).

30. (currently amended): The process according to claim 29, wherein P is a benzyl-containing~~type~~ protecting group, an aroyl-containing~~type~~ protecting group, or a sulfonyl-containingtype protecting group.

31. (currently amended): The process according to ~~any one of claims 26 to 30~~ claim 29, wherein in formula (9), the absolute configuration at *2 is S and the absolute configuration at *3 is R; or the absolute configuration at *2 is R and the absolute configuration at *3 is S.

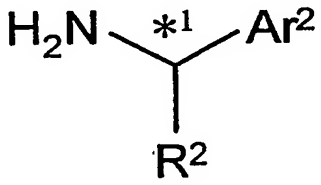
32. (currently amended): The process according to ~~any one of claims 26 to 31~~ claim 26, wherein the optically active α-substituted aminoketone represented by formula (4) or the optically active α-substituted aminoketone salt represented by formula (5) are produced by the process comprising the steps of:

reacting an α-substituted ketone represented by formula (1):



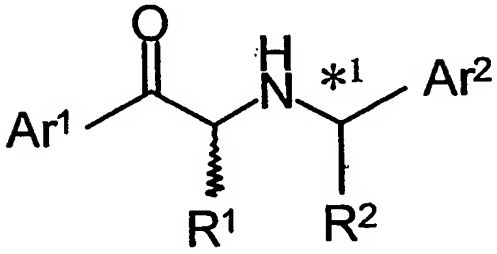
(1)

(wherein Ar^1 and R^1 are the same as in formula (4) , and L represents a leaving group) with an optically active amine represented by formula (2):



(2)

(wherein Ar^2, R^2, and *1 are the same as in formula (4) to yield a mixture of diastereomers of an optically active α-substituted aminoketone represented by formula (3):

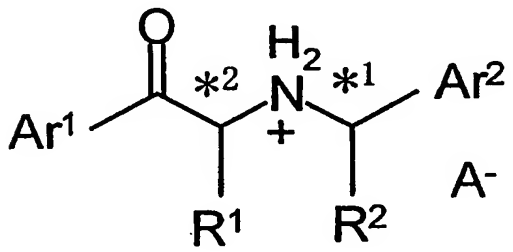


(3)

(wherein Ar^1, Ar^2, R^1, R^2, and *1 are the same as above); and

isolating one diastereomer from the mixture after optionally yielding salts of the diastereomers with an acid ~~of claim 1 is used as the starting material~~.

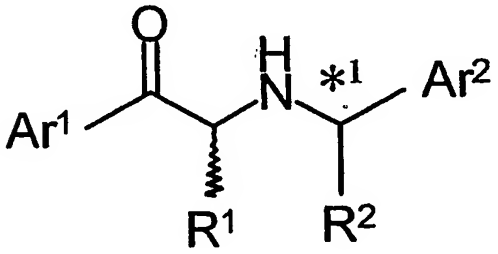
33. (original): A process for isolating an optically active α-substituted aminoketone salt represented by formula (5):.



(5)

(wherein Ar^1 and Ar^2 each independently represent a substituted or unsubstituted C_6-C_{15} aryl group, R^1 represents a C_1-C_{12} alkyl or C_7-C_{12} aralkyl group, R^2 represents a C_1-C_{12} alkyl group, *1 and *2 each represent an asymmetric carbon atom, and A^- represents a counter anion), comprising the steps of:

yielding salts from an acid and a mixture of diastereomers of an optically active α-substituted aminoketone represented by formula (3):



(3)

(wherein Ar^1, R^1, R^2, Ar^2, and *1 are the same as above); and

preferentially crystallizing the salt of one diastereomer from a solvent.

34. (original): The isolation process according to claim 33, wherein the acid is sulfonic acid.

35. (original): The isolation process according to claim 34, wherein the sulfonic acid is methanesulfonic acid.

36. (original): The isolation process according to claim 34 or 35, wherein the solvent is at least one selected from ester solvents, ether solvents, ketone solvents, halogenated solvents, alcohol solvents, hydrocarbon solvents, nitrile solvents, and water.

37. (original): The isolation process according to claim 34 or 35, wherein the solvent is ethyl acetate, acetone, or dimethoxyethane.

38. (currently amended): The isolation process according to ~~any one of claims 34 to 37~~ claim 34, wherein, in formula (5), the absolute configuration at *2 is S and the absolute configuration at *1 is R; or the absolute configuration at *2 is R and the absolute configuration at *1 is S.

39. (original): The isolation process according to claim 33, wherein the acid is hydrogen halide.

40. (original): The isolation process according to claim 39, wherein the hydrogen halide is hydrogen chloride or hydrogen bromide.

41. (original): The isolation process according to claim 39 or 40, wherein the solvent is an alcohol solvent or water.

42. (original): The isolation process according to claim 39 or 40, wherein the solvent is ethanol or a mixture of ethanol and water.

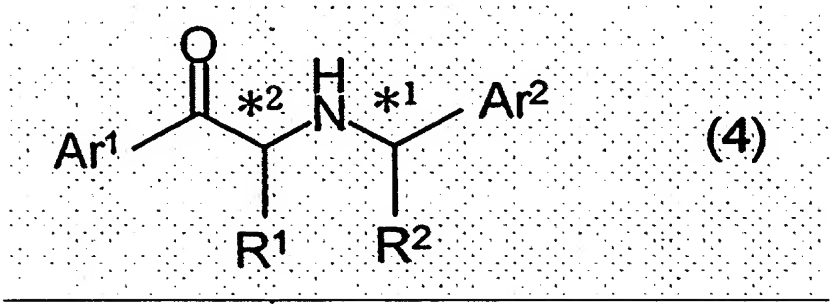
43. (currently amended): The isolation process according to ~~any one of claims 39 to 42~~ claim 39, wherein, in formula (5), the absolute configuration at *2 is R and the absolute configuration at *1 is R; or the absolute configuration at *2 is S and the absolute configuration at *1 is S.

44. (currently amended): The isolation process according to ~~any one of claims 33 to 43~~ claim 33, wherein Ar^2 is a phenyl group or a p-methoxyphenyl group; and R^2 is a methyl group.

45. (currently amended): The isolation process according to ~~any one of claims 33 to 44~~ claim 33, wherein R^1 is a methyl group or an ethyl group.

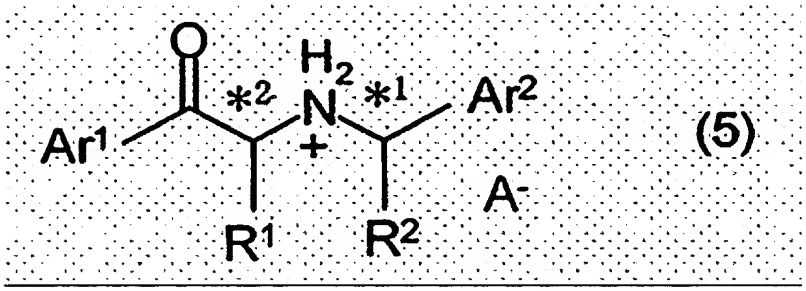
46. (currently amended): The isolation process according to ~~any one of claims 33 to 45~~ claim 33, wherein Ar^1 is a phenyl group, a p-hydroxyphenyl group, a p-benzyloxyphenyl group, a p-benzoyloxyphenyl group, or a p-methanesulfonyloxyphenyl group.

47. (currently amended): An optically active α-substituted aminoketone represented by formula (4) ~~above~~



wherein Ar^1 and Ar^2 each independently represent a substituted or unsubstituted C_6-C_{15} aryl group, R^2 represents a C_1-C_{12} alkyl group, *1 and *2 each represent an asymmetric carbon atom and R^1 is a C_1-C_4 alkyl group or a C_7-C_{12} aralkyl group, or

an optically active α-substituted aminoketone salt represented by formula (5) ~~above~~



wherein Ar^1, Ar^2, R^1, R^2, *1, and *2 are the same as above, and A$^-$ represents a counter anion~~R^1 is a C$_1$-C$_4$ alkyl group or a C$_7$-C$_{12}$ aralkyl group~~.

48. (original): The optically active α-substituted aminoketone or the optically active α-substituted aminoketone salt according to claim 47, wherein, in formula (4) or (5), Ar^2 is a phenyl or p-methoxyphenyl group, and R^2 is a methyl group.

49. (currently amended): The optically active α-substituted aminoketone or the optically active α-substituted aminoketone salt according to claim 47 ~~or 48~~, wherein, in formula (4) or (5), R^1 is a methyl group or an ethyl group.

50. (currently amended): The optically active α-substituted aminoketone or the optically active α-substituted aminoketone salt according to ~~any one of claims 47 to 49~~ claim 47, wherein, in formula (4) or (5), Ar^1 is a phenyl group, a p-hydroxyphenyl group, a p-benzyloxyphenyl group, a p-benzoyloxyphenyl group, or a p-methanesulfonyloxyphenyl group.

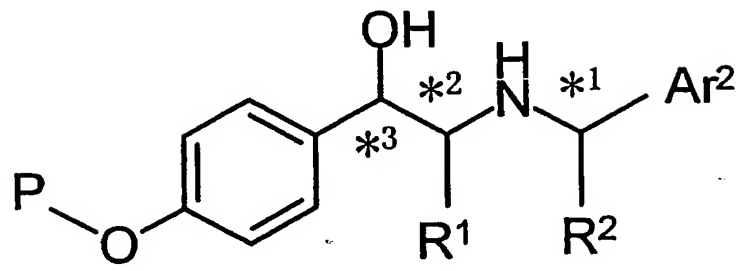
51. (currently amended): The optically active α-substituted aminoketone or the optically active α-substituted aminoketone salt according to ~~any one of claims 47 to 50~~ claim 47, wherein, in formula (4) or (5), the absolute configuration at *2 is S and the absolute configuration at *1 is R; or the absolute configuration at *2 is R and the absolute configuration at *1 is S.

52. (currently amended): The optically active α-substituted aminoketone salt according to ~~any one of claims 47 to 51~~ claim 47, wherein A^- in formula (5) is a methanesulfonate ion.

53. (currently amended): The optically active α-substituted aminoketone or the optically active α-substituted aminoketone salt according to ~~any one of claims 47 to 50~~ claim 47, wherein, in formula (4) or (5), the absolute configuration at *2 is R and the absolute configuration at *1 is R; or the absolute configuration at *2 is S and the absolute configuration at *1 is S.

54. (currently amended): The optically active α-substituted aminoketone salt according to ~~any one of claims 47 to 50 and 53~~ claim 47, wherein A^- in formula (5) is a chlorine ion or a bromine ion.

55. (original): An optically active β-substituted amino alcohol represented by formula (8) or a salt thereof:



(8)

(wherein R^1 represents a C_1-C_{12} alkyl or C_7-C_{12} aralkyl group, Ar^2 represents a substituted or unsubstituted C_6-C_{15} aryl group, R^2 represents a C_1-C_{12} alkyl group, *1, *2, and *3 each represent an asymmetric carbon atom, and P represents a hydrogen atom or a protecting group protecting the hydroxyl group).

56. (original): The optically active β-substituted amino alcohol or the salt thereof according to claim 55, wherein Ar^2 is a phenyl group or a p-methoxyphenyl group, and R^2 is a methyl group.

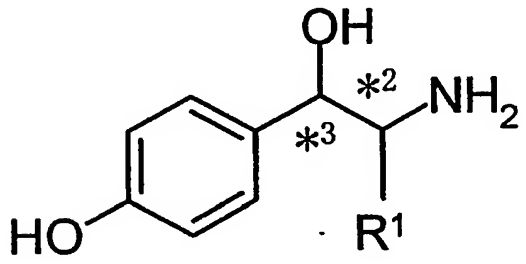
57. (original): The optically active β-substituted amino alcohol or the salt thereof according to claim 55 or 56, wherein R^1 is a methyl group or an ethyl group.

58. (currently amended): The optically active β-substituted amino alcohol or the salt thereof according to ~~any one of claims 55 to 57~~ claim 55, wherein P is a benzyl-containing~~type~~ protecting group, an aroyl-containing~~type~~ protecting group, or a sulfonyl-containing~~type~~ protecting group.

59. (currently amended): The optically active β-substituted amino alcohol or the salt thereof according to ~~any one of claims 55 to 57~~ claim 55, wherein P is a benzyl group, a~~an~~ benzoyl group, or a methanesulfonyl group.

60. (currently amended): The optically active β-substituted amino alcohol or the salt thereof according to ~~any one of claims 55 to 59~~ claim 55, wherein, in formula (8), the absolute configuration at *2 is S, the absolute configuration at *1 is R, and the absolute configuration at *3 is R; or the absolute configuration at *2 is R, the absolute configuration at *1 is R, and the absolute configuration at *3 is S; or the absolute configuration at *2 is R, the absolute configuration at *1 is S, and the absolute configuration at *3 is S; or the absolute configuration at *2 is S, the absolute configuration at *1 is S, and the absolute configuration at *3 is R.

61. (currently amended): A process for isolating an optically active β-amino alcohol represented by formula (9) or a salt thereof with an optically inactive acid from a mother liquor:



(9)

(wherein R^1 represents a C_1-C_{12} alkyl or C_7-C_{12} aralkyl group, and *2 and *3 each represent an asymmetric carbon atom), comprising a step of crystallizing the optically active β-amino alcohol represented by formula (9) or the salt thereof with the optically inactive acid from an alcohol solvent to remove impurities contained therein to the mother liquor to thereby obtain crystals of the optically active β-amino alcohol represented by formula (9) or the salt thereof with the optically inactive acid.

62. (original): The isolation process according to claim 61, wherein R^1 is a methyl group or an ethyl group.

63. (currently amended): The isolation process according to claim 61 ~~or 62~~, wherein the alcohol solvent is methanol, ethanol, or isopropanol.

64. (currently amended): The isolation process according to ~~any one of claims 61 to 63~~ claim 61, wherein an auxiliary solvent is used to improve at least one of the yield of the compound represented by formula (9) above, the process concentration, the liquid properties, and the physical properties of the crystals obtained.

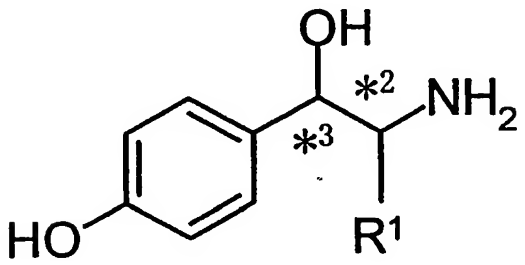
65. (original): The isolation process according to claim 64, wherein the auxiliary solvent is at least one selected from the group consisting of ester solvents, ether solvents, ketone solvents, halogenated solvents, hydrocarbon solvents, and nitrile solvents.

66. (original): The isolation process according to claim 64, wherein the auxiliary solvent is ethyl acetate or methylene chloride.

67. (currently amended): The isolation process according to ~~any one of claims 64 to 66~~ claim 64, wherein the volume ratio of the auxiliary solvent to the alcohol solvent upon completion of the process for crystallization is 1 or more.

68. (currently amended): The isolation process according to ~~any one of claims 61 to 67~~ claim 61, wherein, the compound represented by formula (9) has the S absolute configuration at *2 and the R absolute configuration at *3 and the impurity to be removed is either its diastereomer (having the S absolute configuration at *2 and the S absolute configuration at *3) or its enantiomer (having the R absolute configuration at *2 and the S absolute configuration at the *3); or the compound represented by formula (9) has the R absolute configuration at *2 and the S absolute configuration at *3 and the impurity to be removed is either its diastereomer (having the R absolute configuration at *2 and the R absolute configuration at *3) or its enantiomer (having the S absolute configuration at *2 and the R absolute configuration at the *3).

69. (currently amended): ~~The isolation process according to any one of claims 61 to 68~~ A process for isolating an optically active β-amino alcohol represented by formula (9) or a salt thereof with an optically inactive acid from a mother liquor:



(9)

(wherein R^1 represents a C_1-C_{12} alkyl or C_7-C_{12} aralkyl group, and *2 and *3 each represents an asymmetric carbon atom),

comprising a step of crystallizing the optically active β-amino alcohol represented by formula (9) or the salt thereof with the optically inactive acid from an alcohol solvent to remove impurities contained therein to the mother liquor to thereby obtain crystals of the optically active β-amino alcohol represented by formula (9) or the salt thereof with the optically inactive acid, wherein the optically active.β-amino alcohol represented by (9) is produced by the method of claim 23 or 29 ~~is used as a starting material~~.

70. (currently amended): The isolation process according to ~~any one of claims 61 to 69~~ claim 61, wherein the optically inactive acid is hydrogen chloride, hydrogen bromide, or methanesulfonic acid.